COMMENTS

INITIAL REMARKS:

Applicants wish to thank the Examiner for his time in considering this application and its continuation in the May 6, 2008 Examiner's Interview attended by Alvin T. Rockhill and Edwin A. Sisson. This response incorporates the amendment to claims and other items discussed at that time. This Amendment is discussed on pages 16 (Remarks to the Claims) and page 33 (Obviousness).

Specification:

The amendment to the specification changes the typographical error of "2.5%" to the correct value of "0.25%". That one of ordinary skill knows this to be a typographical error can be found in the paragraph itself and Table I to which the paragraph refers and the experimental plan described in the two preceding paragraphs on page 32. The second preceding paragraph describes that the bottles were evaluated at 0.5, 0.1, 0.2, 0.25, and 0.5 weight percent of the colorant Renol Red. The first column of Table I lists those same concentrations. The sentence containing the typographical error refers directly to the results listed in Table I, which has a concentration of 0.25%, not 2.5%. The sentence also states that the value for 1.5L bottle was 0.5% and that 0.5% is greater than the value of 0.5L bottle. One of ordinary skill knows that 0.5% is greater than 2.5%. The only way for the statement to be consistent with the data to which it refers (Table I) and the relationships in the sentence is for the value to be 0.25%.

Comments to the Claims:

Claim 27, is the only independent claim from which all the other remaining claims depend. Claim 27 has been amended to reflect the amendment discussed and drafted at the May 6, 2008 Examiner's Interview attended by Alvin Rockhill, Ed Sisson, and Examiner Bruenjes. The first amendment adds the limitation that measured haze of the article without the at least one colorant composition be at least 4%. Support for the uncolored article having a measured haze can be found at page 3, line 5 – 10, equating the haze detected by the observer (visual haze) to 4%. As discussed in the Examiner's Interview, the word film is supported by the wall of a container which is a type of film.

The second amendment to claim 27 is cosmetic, and changed expression of the terms the Ai, and Ni in the formula to A_i and N_i, respectively. This was done after discussion in the interview that while everyone reading the claim would know the terms Ai and Ni to be same as the A_i and N_i later in the claim, making the terms consistent clarifies what is evident.

The next amendment to the claims cancelled the claims 81 – 97 to the multi-layer container, thus limiting all claims to the mono-layer or single-layer container of claim 27.

Claim 166 has been amended so that at least one of the light absorbing compositions is a blue colorant as opposed to a yellow colorant. This overcomes the claim objection since claims 155-165 are to a yellow colorant and currently amended claim 166 and its dependent claims (167-176) are now to a blue colorant. That the colorant could be blue is found at Table III.

Examiner's Interview:

A second Examiner's Interview was held in the Examiner's Office on 6 May 2008 with the Examiner, Alvin T. Rockhill and Edwin A. Sisson attending. The Applicants, through Mr. Sisson, also a named inventor of the subject application, reviewed the history leading to the invention, highlighting the discovery and recognition of the role of visual haze as the operative parameter to be controlled and not the measured or transmitted haze.

The principles of operation were demonstrated on a visually hazy bottle and is the same demonstration shown in the first Examiner's Interview. The bottle was uncolored and visually hazy. A red transparent plastic film containing 0.25% Renol Red was passed between the observer and the visually hazy bottle. All agreed the bottle ceased to be seen as hazy – however, the bottle itself was unaltered and still hazy.

Also presented were two green colored bottles of the exact same composition. The bottles were made from:

the same grade and amount type of polyester;

the same grade and amount of nylon; and

the same grade and amount of green colorant.

The bottles were blown into the same mold from preforms having the same preform design. However, one bottle was hazy and the other was not hazy. Pictures (Appendix D) were left with the Examiner showing that one could read letters through the non-hazy bottle yet the letters could not be read through the hazy bottle. The difference between the bottles was that the hazy bottle had more nylon domains between 400 and 700nm than did the non-hazy bottle. The reason that the hazy bottle had more domains between 400 and 700nm was because the preform for the hazy bottles was made on a production injection molding machine designed specifically to be low shear and put less work into the system. It was explained that this would mean the domains would be larger because less work had been

introduced into the system.

The preforms for the non-hazy bottle were made on a low throughput research and development machine with high shear (work) and longer residence time. This leads to smaller domains; thus less domains were in the range of 400-700nm of the stretched article. The green bottle with the lower amount of domains was visually not hazy, while the green bottle with more domains in the range of 400-700nm was visually hazy.

This demonstration underscores that the colorant must be present in an effective amount (proper absorbance at the right wavelengths) and places a very high burden on prior art disclosures. Just because an article in the prior art may have domains between 400 and 700nm, and may be colored, there is no guarantee that the right colorant has been added in the right amount for the value of X to inherently be less than 9.5.

The Office Action Rejections of Anticipation and Obviousness relative to Kim USPN 5314987 (Kim '987) and Kim '684 (US Application 20020001684) were reviewed, with the results discussed below.

The Examiner's Interview then proceeded with the draft proposed claim language which has been incorporated into this response.

The interview concluded with a discussion of the documents submitted from the European Opposition. It was pointed out that the Opposition relied upon the art already on record and overcome. The Applicants then reviewed the art as a whole, which in Applicants' opinion (and discussed below) demonstrates that <u>at the time of the invention,</u> the person of ordinary skill would have done everything in his or her power to keep the domains below the wavelength of light, with the prior art providing many alternative ways to do this.

Thus, the concept of intentionally placing the domains in the wavelength of light and further using a colorant to mask the haze known to be caused by domains in the wavelength

of light is non-obvious because it goes against the teachings of every prior art document presently on the record, goes against common sense – if haze is the most important attribute why would one take action known to cause haze, and none of the art suggests, nor has it been argued in any rejection, that there is an expectation that by adding color, the value of X would be less than 9.5.

ARGUMENT:

I. **CLAIM OBJECTIONS.**

The Office Action objected to claims 166-176 as being substantially the same as claim 155-165. Claims 155-165 are to a colorant composition being yellow. Currently amended claim 166 (and 167-176 by dependency) are to the at least one colorant being blue. This is now substantially different from claims 155-165.

II. ANTICIPATION

The Office Action rejected claims 27-40, 60-83, 81-95, 97, and 131-143 under 35 U.S.C. 102(b) as being anticipated by Kim (USPN 5,314,987) (Kim '987).

In order to anticipate a claim, the reference must contain all the elements of the claim. As discussed in the Examiner's Interview, it is impossible to determine whether the articles of Kim '987 have domains between 400 and 700nm because the color is not caused by domains in the wavelength of light, the increased clarity of the articles as used in Kim '987 means that yellow/green has been neutralized, not a decrease in haze, and the monolayer containers which might have domains in the wavelength of light is hazy.

Both rejections (anticipation and obviousness) rely upon two positions which are not supported by the art. The first is the view that the articles of Kim '987 inherently have domains between 400 and 700nm. The stated reasoning is that the green or yellow color of the PET/Nylon blends is caused by domains between 400 and 700nm. The second is that Kim '987 teaches adding cobalt to increase the "clarity" of the article and thus Kim has achieved a haze free container.

DOMAINS:

A tabular comparison of the Kim '987 and Kim's later publication (Kim '684) regarding color was reviewed in the Examiner's Interview. It is attached as Appendix A and can be referred to if desired.

The statement that the green or yellow color is caused by reflection from MXD6 domains in the PET is incorrect. Kim '987 explicitly teaches that the green or yellow color is NOT caused by the domains but that the color is caused by the catalyst system (col 3, lines 45 – 53). Kim '987 teaches switching to a different catalyst system and gradually adding cobalt to the preferred catalyst system to neutralize the green or yellow color. (col 4, lines 4-12 and col 4, lines 22-28).

That the green/yellow color is NOT caused by the presence of domains, but by the catayst residue is also explicitly stated in Kim's later publication (Kim '684).[1]

It is known in the art that the color in PET/MXD6 structures is due to the presence of catalyst residue in the polyester.

Kim '684 at [50, lines 6-8].

Kim '684 teaches, just as Kim '987, that the color is controlled by "limiting the amount of catalyst." [50, lines 8-9]

A 2nd Rule 131 declaration of Dr. Kevin L. Rollick submitted with this response states that after reading the experiments of Kim '987 and Kim '684, it his conclusion that the color is caused by catalyst residues and that the color is not caused by the nylon domains.

1 The rejections to Kim '684 were previously overcome. That this reference has the same inventor as Kim '987 is established by the fact that belongs to the same patent family as Kim '987. The reference is already part of the record with Kim '684 claiming priority from Appn No. 07/761,490 which is now Kim '987, the patent cited in the current rejection.

(See Declaration #2 of Dr. Kevin L. Rollick at points 8, 9, 10 and 12.)

It is well established that to be an inherent property, the property must always be present, and not be a probability or likelihood.[2] Even if there is a theory that nylon domains between 400 and 700nm cause color that theory is not operative here because the later Kim reference (Kim '684) specifically attributes the color to catalyst residues and the examples of Kim '987 experimentally demonstrate that switching the catalyst causes the color to disappear. (Compare Blend Ex-1 C2 (col 7, lines 40 -42) with Blend Ex-1 D3 (col 7, lines 48-51) – the only difference is the catalyst system of the PET (Blend A vs Blend B). Since the color of the articles of Kim '987 is experimentally and explicitly stated to be caused by catalyst residue, the presence of color cannot be used to infer the presence of domains lying between 400-700nm.

Additionally, Kim '684 teaches that unstretched articles have domains between 100 and 300nm (Table I). There is no overlap of 100 – 300nm with the claimed range of 400 to 700nm. The Examples A through D of Kim '987 are unstretched. Therefore, absent additional information, their domains are also likely to be between 100 and 300nm and cannot inherently disclose domains between 400 and 700nm. In fact, no evidence in either reference leads one to infer or conclude that the compositions A through D of Kim '987 have domains between 400 – 700nm. Therefore, neither the composition nor the film can anticipate the claimed article.

Dr. Rollick, in his second declaration (Section 21) provides a discussion of all the factors that may affect the domain size which include: the interfacial surface tension between the nylon and PET, the amount of work introduced into the blend, which is a function the

2 The MPEP is quite specific that a rejection based upon inherency must contain a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art and that it cannot be based upon probabilities. (See MPEP at 2100-47, Rev. 6, Sept. 2007.

amount melt viscosity of both polymers, the molecular weight of the polymers, the temperature at which the blending occurs, the amount of shear introduced which is in part established by the amperage of the blending apparatus (extruder), the design of the screw, and residence time. With all of these variables, it is impossible to infer a domain size from "a blend" (Section 21, last sentence).

The green bottles shown in the Examiner's Interview, which were stretched, demonstrated that the same article can go from haze free to hazy by just changing the machine upon which the article is made. It should also be noted that there was no haze in the thread or neck region of those samples which is the unstretched portion. This haze free nature (small domain size) is what one would expect with just a cast film as used in Example series 1, A-D of Kim '987 and supported in Kim '684, Table 1.

The only monolayer stretched articles in Kim '987 are the monolayer bottles used as the comparative examples in Example Series 2. First, it is important to note that the composition used in the stretched bottles of Kim '987 is NOT the composition which according to the Office Action anticipates the claimed matter. The composition considered anticipatory in the rejection is Composition D of Example 1 (col 7, lines 43-53), which is really composition B of Example 1 with cobalt gradually added (col 7, line 43). Blend B is the antimony-germanium catalyzed PET, also known as "a/g – PET" (col 4, lines 16-21). The composition used in the bottles was 'not "a/g - PET" ' (See footnotes to Table 1 at ** and ***).

Therefore, one cannot state with certainty there are domains between 400-700nm when Kim '684, teaches that stretching yields domains of 2000 to 4000nm (See Table I).

CLARITY and HAZE

The disclosures of Kim '987 and '684 regarding haze was discussed and summarized in a table presented at the Examiner's Interview. That table is included in this response as

Appendix B and can be referred to if desired.

As relied upon in the Office Action, Kim '987 teaches that the clarity of the composition is improved when cobalt is gradually added to a blend of a/g-PET/Nylon (Ex 1, D2 and D3 at col 7, lines 43- 54). The Office Action assumes that clarity means decreased haze. However, the word clarity or clear in Kim '987 means that the composition is without color. It does not mean that the article transparent.

See col 7, lines 46-50

> "Blend D1 appeared to have improved clarity over blend B, i.e., the yellow color appeared somewhat neutralized. Blend D2 appeared to have improved clarity over blend D1, i.e. the yellowish color appeared to be mostly neutralized."

See also col 5, lines 37-38

> "even greater improvements in clarity (neutralized green or yellow color),"

or col 3, lines 45-50 –

> "the inherent greenish color of the aforesaid PET and nylon, and PET, nylon, cobalt complexes can be neutralized, or that such blends can have improved clarity, by employing in such blends PET produced from a catalyst system based on germanium and antimony or having virtually no residual manganese and cobalt, as opposed to PET produced from a catalyst system based on antimony, cobalt and [sic] magananese."

Therefore, when Kim '987 states that an article is clear or has improved clarity, Kim '987 means that the article has a neutral color, not that the article is free from haze or is transparent. This is discussed further below where transparency is discussed within Kim '987. Dr. Rollick also agrees with this interpretation of the use of the term clear or clarity in Kim '987. (See Declaration #2 of Dr. Kevin L. Rollick, at point 14 and footnote at point 22(a))

Therefore, the position that Kim '987 inherently discloses an article with domains between 400 and 700nm that the article has a value of X less than 9.5 cannot be maintained.

The Office Action further states that Kim '987 anticipates a colored transparent bottle or container referring to col. 6, lines 59-62. That reference in Kim '987 is to a multi-layer structure. Claims 51 - 97to a multi-layer structure have been cancelled by this amendment with all the remaining claims specifically limited to a monolayer or single layer structure.

The monolayer bottles taught by Kim '987 is found in Example 2, Table I, Bottles A and B, (referred to as Ex 2-A and Ex 2-B). Ex 2-C and 2-D are multilayer bottles with the blend of the composition Ex 2-A and Ex 2-B respectively. Bottle E is monolayer, but it does not contain any filler.

Ex 2-A and Ex 2-B are the comparative example to the invented multilayer structure of Kim '987 and described at col 2, lines 60-62. The embodiment of the invention is in multi-layer containers only. See co1 2, lines 38-39 – "In this embodiment..] [Nylon blended with Cobalt] is made into a multilayer film." The discussion of col 2, lines 29 – col 3, line 12, SUMMARY OF THE INVENTION, is to the multilayer structure. The BACKGROUND of Kim '987 supports the multi-layer structure at col 1, line 55 stating that the prior art fails to disclose or suggest multilayer structures.

Assuming that the monolayer bottle of Kim '987 does have domains in the range of 400-700nm, one can conclude with certainty that bottle is not within the color limitation of the proper amount at the proper wavelength corresponding to the domain distribution, or both; i.e. X is not less than 9.5 One can be certain of this because the bottles of Ex 2-A and Ex 2-B are hazy. This is explained below and in Declaration #2 of Dr. Kevin L. Rollick at 17 and 18).

That the monolayer bottles of Kim '987 are hazy is readily apparent from col 8, lines 53-52. This passage describes that there was an improvement in optical properties achieved

by sandwiching the composition used in bottles Ex 2-A and Ex 2-B into the multilayer bottles of Ex 2-C and Ex 2-3. This optical improvement was bottles with improved transparency, inferring that the bottles Ex 2-A and Ex 2-B are not transparent (but hazy). The discussion includes the transparency of Ex 2-C and Ex 2-D and states that

> "the improved optical property (substantially transparent or translucent) of the 3 layers bottle [Ex 2-C, 2-D] is due to the fact that the blend layer [containing the filler] is only 10% of the total structures and the protective outer layers are transparent."

In other words the haze was reduced by 90%. Dr. Rollick agrees with this interpretation noting Ex 2-A and Ex 2-B to be hazy. (Declaration #2 of Dr. Kevin L. Rollick at 17 and 18).

The certainty that the monolayer bottles of Ex 2-A and Ex 2-B are hazy is stated unequivocally by Kim '684. As discussed in Dr. Rollick's Declaration, Kim '684 states that "[c]ontainers made from this structure (the multi-layer structure) are clear and do not exhibit the haze found in prior art containers." (Kim '684 page 4, [31, 13-14]). The prior art structures are the monolayer injection blow (stretched) bottles of PET. Kim '684 provides the haze of this type of structure, 7.5% MXD6, and 120ppm Cobalt having a normalized haze of 3.16 % Haze/mil. (Table 3, 2nd Row). This is the same type of bottle and composition of the monolayer structure noted in Kim '987.

Therefore, Kim '987 cannot be found to anticipate a monolayer container that is transparent, because the monolayer bottle of Kim '987 is hazy. Therefore, even if the comparative example of Kim '987 has domains in the range of 400-700nm, it cannot inherently have an X value less than 9.5.

The examples shown during the Examiner's Interview also establish this point. Those bottles were green, as are the bottles of Kim '987. One bottle was hazy, the other not.

Therefore, green does not always (inherently) mask the haze. Kim '987 admits that the bottles of Ex 2-A and Ex 2-B are hazy, as well as Kim '684 declares that the prior art monolayer structures are hazy.

The fifth and sixth sentence of the Office Action states that an effective amount of light absorbing composition is added to neutralize the yellow color (col 4, lines 44-52) and the Office Action concludes that because the color is neutral the X value is less than 7.5. The colorless composition considered anticipatory is only found in compositions Ex-1 D2 and Ex-1 D3 (col 7, lines 45-50)[3]. These are antimony-germanium compounds (a/g - PET). (col 7, line 43, stating that the D is blend B with Cobalt and col 7, line 31-32 stating that Blend B is germanium and antimony). These are not the compositions used in the containers of Ex 2.

The composition used in the containers Ex 2-A and 2-B is the PET which is not antimony – germanium (. Table 1, **, ***, ****, *****) Nor is the composition of the containers a neutral color. When cobalt is added to the composition of Ex 2-A (Ex 2-B) the container color went from green to dark green, not neutral (Table 1, ***).

3 As stated earlier, clarity in this instance does not mean transparency or haze, but less yellow color "improved clarity over blend B, i.e. the yellowish color appeared to be mostly neutralized." (col 7, lines 46-49).

If, as stated in the Office Action a neutral color is required for the value of X to be less than 9.5, then Ex 2-A and 2-B do not have an X value less than 9.5 because they are green and dark green (Table I, footnotes).

The neutral colored composition cannot anticipate the value $X < 7.5$ or 9.5 because one does not know the size of the domains nor the distribution of the domains of Ex 1- D2 and D3. As also noted by Dr. Rollick (Declaration #2 of Dr. Kevin Rollick at 22), the Kim '987 does not inherently disclose domains in the required range of composition Ex 1-D. Since the domains of Ex 1-D may or may not be in the required range, the composition of D2 and D3 cannot inherently anticipate the claims. The later Kim '684 references disclose that an unstretched article has domains 100 to 300nm and the stretched article has domains 2,000 to 4,000nm (Table 1). Without knowing the size of the domains in composition D, it is impossible to conclude that the value of X for Ex-1 D2 and D3 is less than 7.5.

Additionally, the spectra of the Ex-1 D2 and D3 are not disclosed, thus making it impossible to determine the value of X. All that can be concluded from a neutral colored bottle is that enough blue was added to balance out the yellow so that the amount of light reflected is relatively the same across the visible spectrum, thus no color is apparent. (See Declaration #2 of Dr. Kevin L. Rollick at 20 b).

Dr. Rollick specifically analyzed Kim '987 for the domain size and spectra and concluded that neither the size of domains, nor the amount of light absorbed can be determined (See Declaration #2 of Dr. Kevin L. Rollick at point 20). Without knowing the domain size or the spectra of the color shown, it cannot be inferred that the value X, which is a specifically derived formula taught in the specification has a value of less than 7.5 or 9.5 for that matter. This is particularly true when Ex -2 A and B of Kim '987, without and with cobalt self stated to be hazy and are considered to hazy by the later Kim '684.

It should not go unnoticed that the comparative examples of Kim '987 (Ex 2 A and B)

are green and Kim's later publications (Kim '684 and Kim '161) teach directly away from green colored bottles (Kim '684 at [0039]) where the green is caused by the nascent catalyst residue. If the green of Kim '987 produced a haze free container (i.e. the right colorant was added at the right amount to absorb at the domains which might be present at 400-700nm), the later Kim reference, '684, would not teach to eliminate the green.

Dr. Rollick addresses the objective portion of this discussion (See Declaration of Dr. Kevin L. Rollick at 20).

The following table reviews the composition and articles of Kim '987 and where each is deficient in anticipating the claims.

TABLE I – ANALYSIS OF EACH ARTICLE OF KIM '987

ID	Catalyst types: not a-g a-g	COLOR	
A	not a-g 0 Cobalt	Green	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
B	a-g 0 Cobalt	Yellow-ish	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
C1	not a-g 100 Cobalt	Green	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
C2	not a-g 150 Cobalt	Green	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
D1	a-g 50 Cobalt	Yellow-ish	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
D2	a-g 100 Cobalt	Less Yellow-ish	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
D3	a-g 150 Cobalt	Neutral	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
D4	a-g 200 Cobalt	Bluish Hue	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)

D5	a-g 300 Cobalt	Bluish color	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X No stretching, Kim '684 teaches unstretched articles have domains between 100-300nm (Table I)
Ex 2 A	not a-g 0 Cobalt	Green	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X Stretched, Kim '684 teaches articles have domains between 2000 - 4000nm (Table I) Green does not mean no haze or X <9.5, recall the demonstration bottles – the same contribution, different distribution, one hazy, the other was not.
Ex 2B	not a-g 100 Cobalt	Dark Green	Domain size, distribution and amount of light absorbed at each wavelength unknown Unable to determine if domains are between 400- 700nm and unable to determine X; Green does not mean no haze or X <9.5, recall the demonstration bottles – the same contribution, different distribution, one hazy, the other was not.
Ex 2C	not a-g 0 Cobalt		Not single layer construction (Table 1, ****)
Ex 2D	not a-g 100 Cobalt		Not single layer construction (Table 1, *****)
Ex 2E	not a-g		No incompatible filler (Table 1)

As can be seen, there is no embodiment which has all the elements of the first independent claimed subject matter. All of the elements of the claim are not found in any of the articles of Kim '987, either explicitly or inherently.

III. OBVIOUSNESS

Rejection 3 rejected claims 27-40, 58-63, and 81-185 under 35 U.S.C. 103(a) as being obvious over Kim (USPN 5,314,987).

This rejection relies upon the basis as the first rejection – that the domains are inherently present between 400 and 700nm because the examples of Kim '987 are inherently green or yellow and the assumption the improved clarity from adding cobalt meant reduced haze and not the neutralization of the yellow/green color. Since this is the same ground used in the first rejection, the arguments to the first rejection are believed to overcome this rejection as well.

In sum, at the time of the invention, the scope of the entire art taught that color is caused by catalyst residue and that the color is to be eliminated by controlling the catalyst residue or adding cobalt octoate in a controlled amount so as to create a neutral appearance but not adding so much cobalt as to create a blue color (Kim '987 at col 4, lines 31 – 38 and Declaration #2 of Dr. Kevin L. Rollick at point 11.)

The question asked in the Examiner's Interview was that there may be a prior art disclosure that without knowing that the domains were between 400 and 700nm that one would add a color and thus lie within the claimed range. While Applicants are not conceding that this is likely or that it renders the claim obvious – particularly given that the person of ordinary skill would have to be oblivious to the large body of art teaching how create articles with domains less than the wavelength of light (See Section IV discussion on Kim '684, Turner '283, Al Ghatta WO, Cahill '585). Applicants have nevertheless amended the independent claim to require that the article without the colorant have a measured haze of 4%. The haze measurement is to be taken as one would measure haze a film of 15 mils. Because 4% haze is detectable by the visual eye regardless of the film thickness, one of

ordinary skill knows that the 4% haze number is an absolute number and is not normalized or adjusted for the wall thickness. This limitation means that one of ordinary skill would not only have to add color to an article with domains between 400 – 700nm, those domains would also have to be present in an amount sufficient to increase the haze of the article to greater than 4%, as called for in claim 27.

A number of independent reasons why claim 27 is not rendered obvious by the cited prior art can be summarized as follows: To render a claim obvious, the combination of elements must exist within one or more or documents with a proper motivation to combine the elements as claimed, at the time of the invention.[4] A claim cannot be rendered obvious by a combination when the proposed combination is taught away from,[5] and/or the proposed modification destroys the utility of the prior art invention,[6] and/or there is no expectation of success.[7] Any one of these requirements renders a claimed article non-obvious, thus overcoming the rejection. As noted below, Kim '684 teaches away from domains in the wavelength of light, putting domains in the wavelength of light destroys the utility of the article by risking making it hazy, and there is no expectation of success that randomly adding color selected from the thousands of colorants available to an article having domains between 400 and 700nm would create an article with an X value less than 9.5.

As demonstrated later in Section IV of this response (GRAHAM FACTORS), there was no motivation – at the time of the invention-, including common sense or commonly known principles, which would cause one to consider making an article having domains between 400 and 700nm, let alone add color and hope that the person was lucky enough to

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4 35 USC 103(a) and MPEP 2100-121 Rev. 6, Sept 2007

5 MPEP Rev. 6, Sept. 2007, page 2100-168 citing *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).

6 MPEP Rev. 6, Sept. 2007, page 2100-141 citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

add the right color in the effective amount.

In stark contrast, as summarized in the table in Appendix C of this submission, the prior art at the time of the invention teaches one to avoid domains in the wavelength of light (400 – 700nm). This is not one document, but a consistent theme in all the prior art on record. The conclusion at the time of invention was:

1. Haze is caused by large domains
2. Keeping the domains less than the wavelength of light (400 – 700nm) solves haze.
3. There are many ways to achieve domains less than the wavelength of light.

Teaching away:

Thus, even if Kim '987 discloses an article with domains in the wavelength of light it does not render the claim obvious. Kim '987 cannot be read in isolation, but must be read in view of Kim '684, published later, which explicitly teaches to keep the domains less than the wavelength of light ([23,lines 12-16], [32, lines 15-18], [38]. Kim '684 provides the method to do this and provides the analytical data showing no domains in the wavelength of light. (Table I). The art, as whole, therefore, teaches directly away from making an article with domains between 400 and 700nm.

Destroys Utility:

Since large domains cause haze and haze destroys the utility of an article for packaging (Turner et al USPN 6,444,283 col 1, lines 55 - 59), making an article with domains in the wavelength of light that cause haze risks destroying the utility of the article for packaging. Since the primary purpose of Kim '987 is a packaging article, making an article with domains between 400 – 700nm destroys the utility of Kim '987.

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7 MPEP, Rev. 6, Sept 2007, p2100-141.

Expectation of Success

Even if Kim '987 discloses domains between 400-700nm, it does not disclose adding an effective amount of colorant (proper amount for the proper absorbance at the right wavelengths). According to the Office Action, the neutral color is required and the monolayer bottles are green. As demonstrated with the two green bottles in the Examiner's Interview – one hazy, the other not, there is no expectation of success that adding a random color to the bottle would reduce the reflected haze to create an article having a value of $X<9.5$.

Thus, absent the knowledge of the present invention, there is no expectation of success that a hazy useless article could achieve an X value of less than 9.5 by adding a color. While many prior art documents disclose coloring PET, they disclose the genus of colors. Obviousness cannot be established by disclosing the genus, rather the specific species must be disclosed.[8] The species of colors in this instance are those that absorb light in relation to the size of the domains and are present in an amount related to number of domains. This species is very specific to the domain distribution in each article, therefore a generic disclosure of adding color or even adding a specific shade of color does not inherently disclose the claimed article. Since to be obvious, the combination must have some expectation of success, this claim is not obvious in light of Kim '987 or Kim '987 in combination with the art on record.

While Applicants do not think that the Kim references conflict, when faced with two conflicting documents, the strength of each must be weighed for their value in deterring one

8 A prior art reference that discloses a genus still does not inherently disclose all species within that broad category. *Metabolite Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1367, 71 USPQ2d 1081, 1091 (Fed. Cir. 2004).

of ordinary skill from continuing in the direction of the invention. In Kim '987, the comparative monolayer structure is hazy. In Kim '684, the comparative monolayer structures are hazy. The solution in both Kim references is to use a multilayer structure or use the teachings of Kim '684 and keep the domains below the wavelength of light. There is hint or suggestion in either reference for one of ordinary skill to purposely make a monolayer container with domains between 400 and 700nm. Therefore, at the time of the invention, one of ordinary skill would not make an article having domains between 400 and 700nm and certainly one of ordinary skill would not color it with the specific type of colorant in the amount required.

IV. GRAHAM ANALYSIS AND THE SUBMITTED EUROPEAN OPPOSITION

The analysis according to the Graham factors follows. This analysis is summarized in tabular format later in Appendix C and the Examiner may wish to refer to that table.

Scope of the relevant prior art, and dates.

A) Domains[9]

Compositions of polyesters, incompatible fillers, with the incompatible fillers present as domains were known at the time of Applicants' invention. For example, Cahill USPN 6,083,585 (Cahill '585 D1), already on the record and overcome, teaches domains made from segments of polybutadiene. Kim '684 D2, also on the record and overcome, explicitly discloses domains of MXD6. Al Ghatta EP 0964 031 (Al Ghatta EP D3) discloses domains of nylon with no reference to haze while Al Ghatta WO 03/029349 (Al Ghatta WO D12) teaches that haze is reduced by keeping the average of the domains below 200nm (page 3). Tajima (USPN 5,300,572) discloses domains of nylon in various polyesters modified with sulfo-isophthalic acid, and Turner et al (USPN 6,444,283, Turner '283 D19) teaches the use of low molecular weight polyamides to reduce haze.

Analysis of these documents establishes that the prior art virtually all teach the same principles:

1. Haze is a known primary defect that destroys the utility of the container and the elimination of haze is a design priority.
2. Domains greater than the wavelength of light cause haze and keeping the domains substantially less than the wavelength of light virtually eliminates haze.
3. Multiple techniques exist to produce articles with domains less than the wavelength of light.
    a. Use low molecular weight polymers at low extruder rates
    b. Use low stretch processes such as extrusion blow
4. These techniques are within the ordinary skill of the art.
5. These solutions produce visually clear containers.

9 These documents are found in the opposition brief submitted to the European Patent Office for the corresponding granted European patent application. A copy of the brief was submitted in the IDS. Since the European proceeding cites the references as D1, D2, etc, that reference code is used as well.

B) Haze is a defect recognized by those of ordinary skill and a property to be avoided.

Haze, according to the prior art, is a well known defect in packaging applications and eliminates the practical utility of the container in food applications (See Turner et al '283, D19, col 1, lines 55-59 stating that haze limits the practical use of the composition in food packaging). This is the consensus of all the prior art addressing this on record.

Cahill '585 D1:

Teaches that the poor clarity of prior art packages is a shortcoming (col 3, line 53). Cahill '585 D1 also teaches that a clear, thin walled polyester with various other attributes is a subject of substantial technical and commercial interest (col 3, lines 58-61). Cahill '585 D1 defines the salient features of the polyester container as (1) transparency, (2) rigidity, (3) good passive oxygen barrier properties, (4) recycle capability, (5) reasonable cost and (6) long history of experience and use in the packaging industry (col 4, lines 4 – 8). Cahill '585 D1 further explains that clarity is an important consideration in packaging and bottling polyesters (col 4, lines 17 – 18).

Kim '684 D2

Teaches that the deleterious effect of haze is undesirable [0038]. Kim '684 D2 also teaches that lack of clarity is a problem in the prior art [0014]. Increased clarity is always presented in a positive description; e.g. superior to prior art [Abstract], greater [0014], improvement over prior art [0020 and 0050] are all adjectives used to describe increased clarity. Reduced clarity is presented in a negative description; e.g. reductions in clarity are considered deleterious [0023], a deterioration [0047].

Al Ghatta WO D12

Teaches that transparency limits the amount of polyamide barrier material to less than 2 wt% (page 2, 1st full paragraph, last sentence). It is noted that this is the same position taken by Turner '283 D19).

Turner '283 D19 (col 1, lines 55-59)

Teaches that a high haze value limits use in practical food packaging applications.

Thus one of ordinary skill at the time of invention knew that taking steps which increased haze or ignoring ways to reduce haze goes against conventional wisdom and the teachings of the prior art.

C) Keep Domains Small (Less Than The Wavelength of Light) Eliminates the Haze Caused by Large Domains.

The prior art (Kim '684 D2, Cahill '585 D1, Al Ghatta WO D12, Turner '283 D19) teach that haze is caused by large domains. The art that discloses measurements of the domains teaches that haze caused by the large domains can be eliminated by keeping the domains less than the wavelength of light. The person of ordinary skill in making plastic bottles with incompatible domains is therefore taught to keep the domains less than the wavelength of light in order to make containers with utility in food packaging.

Kim '684, D2 and Cahill '585, D1 report the domain size of different incompatible fillers. Each teaches that domains about the wavelength of light or greater cause haze. Additionally, they both teach the same solution to eliminate the haze - keep the size of the domain less than wavelength of light in the finished article.

Kim '684 D2

> Kim '684, D2 teaches that the cause of haze in the container [the problem] is the scattering of light caused by oriented particles greater than the wavelength of light [0023]. Kim '684 D2 teaches the solution to the haze is to **"[limit] the degree of orientation so that the MXD6 domain increases in size up to less than the wavelength of light"** (emphasis added) [0023].
>
> Kim '684, D2 teaches the embodiment that "these compositions are oriented to a degree so that the MXD6 domain increase is size up to less than the wavelength of light" [0032]. The data of Kim '684, D2 [Tables 2, 3, 0027] demonstrates that the injection blow process produces bottles of high haze.
>
> Kim '684, D2 teaches the problem of haze from large domains is solved by keeping the domains in the final article small. This is done by making bottles using a low extrusion blow process – a known low stretch process [0025, 0030].

Cahill '585 D1

Cahill '585 D1 teaches the use of copolymers with very small polyolefin oligomer segments which maintain transparency (col 5, lines 51-53) as a substitute for larger sized polybutadiene particle sizes (col 5, lines 48-51) and as a substitute for inorganic (e.g. iron particle) systems which are known to have poor clarity10 (col 3, line 53).

Cahill '585 D1 teaches that the polyolefin (incompatible) segments appear to inhibit (scatter) the transmission of light when too many of the segments are about the size of the wavelengths of visible light (col 11, lines 14 – 17). Cahill '585 D1 teaches to use low molecular weights where clarity must be considered (col 11, lines 30 – 35). As corollary, Cahill '585 D1 teaches that molecular weight (size) is not so important when clarity is not an issue (col 13, lines 3 – 8).

Cahill '585 D1 also teaches that the molecular weight (size) of the PBD oligomer influences the clarity (col 13, line 13). Cahill '585 D1 teaches to keep the domains under 300nm when clarity is important (col 23, lines 44-48). Cahill '585 D1 further teaches one to use a lower molecular weight material and/or use lower extruder rates (increased mixing time) to "produce more favorable polyolefin oligomer polyolefin segment diameter size distributions with predominately smaller diameters that do not interfere with the visible light" (400nm to 800nm) (col 23, 52 – 62). While Cahill teaches a preferred molecular weight range of 1,000 to 3,000, it further teaches that one of ordinary skill could use a segment having a number average molecular weight of as low as 100.

The examples and techniques of Cahill provide a clear and rigid bottle similar in appearance to bottles without the domains (Abstract). "Similar in appearance" is a visual observation, such as visual haze. Furthermore, Cahill teaches that selecting the proper molecular weight (size) for clarity is within the ordinary skill of one in the art (col 13, line 13-16).

10 While Kim '987 uses clarity to mean neutralization of color, Cahill '585 uses the word clarity to mean haze.

Al Ghatta Disclosures

Al Ghatta EP D3,

Discloses an article having domains less than 1 micron (1,000nm) with a preferable distribution of domains having an average domain size between 200 and 400nm. Al Ghatta EP is silent as to the domain size in the container and whether visual haze is observed in the container.

Al Ghatta WO '349 D12,

Published after Al Ghatta EP D3, teaches that haze is improved by keeping the average size of domains between 30nm – 200nm (page 2, 3rd full para, line 6). While Opponents in the European Opposition cite Al Ghatta EP D3, one of ordinary skill cannot read Al Ghatta EP in isolation . Al Ghatta EP must be read in light of Al Ghatta WO and learn that the domains must be kept very small.

Turner '283 D19

Like Cahill '585 D1, Kim '684 D2, and Al Ghatta WO D12; Turner et al D19 also teaches keeping the domains small reduces the haze. Turner teaches that using low molecular weight polyamides (e.g. MXD6) reduces the haze (col 3, lines 24 – 30). It is noted this is the same technique taught in Cahill. From Cahill, one of ordinary skill knows that by using low molecular weight materials, the domains are kept small. As pointed out under Cahill. Cahill teaches to vary the molecular weight and extruder time to increase the dispersions to keep the domains of the incompatible material less than 300nm (col 17, lines 56-58; col 5, lines 48-53).

D) The Prior Art Does Not Disclose Adding color to Containers with Domains between 400 – 700nm and In Fact, The Prior Art Teaches Away From Color.

The use of color in polyester stretched containers is known, however, the use of colors in articles with domains between 400-700nm is actually taught away from in the prior art. Additionally the selection of color and its amount based upon the distribution of the domains is not disclosed in the prior art.

There is no expectation in either Kim '684 or Cahill '585 that adding color would make a hazy useless container non-hazy and useful. It goes against common sense and

conventional wisdom to continue to further develop an article when it has already failed its original purpose. As pointed out in the specification, not only would one have to traverse haze and add a color to a hazy useless bottle, one would have to traverse the infinite number of color options and select the proper absorption spectra and add the color in the proper amount to mask the visual haze.

Because Applicants' discovery that the color can mask the visual haze of an article with domains between 400 and 700nm, yielding an article with a measured Hunter Haze with little or no visual haze was not known, there was no expectation of success. Since a hazy bottle is useless, adding color would only mean that one has a colored useless hazy bottle.

As discussed below, the prior art creates no expectation, motivation or goal that adding specific colors, with absorbance relative to the domains between 400-700nm could absorb the light available for reflection to below 9.5 ($X<9.5$). In fact, as demonstrated below, the art teaches directly against coloring the containers, particularly when they have visual haze.

Analysis of the closest prior art shows that coloring the container is not a solution, and in fact is to be excluded. The addition of colorants is taught against in functionalized PBD and MXD6. The use of colorants for the composition of MXD6 with PET is specifically excluded by Kim '684 D2.

Kim '684 D2

Kim '684 D2 teaches away from and against colored articles. The prior art of Kim '684 D2 are green in color [0039]. Kim '684 D2 teaches that the color in the blends is caused by the residual catalysts [0050]. The prior art referred to in Kim '684 D2 include the priority references such as Kim '987 [p1, para 60: related references]. The article embodying the solution of Kim '684 D2 is "free from green" [0039]. However, a visual green is one of colors specifically called out in the patent in suit [Table III] and adding yellow and blue creates green.

Cahill '585 D1

Cahill '585 D1 discusses additives, including colorants [col 18, line 49 - col 19, line 5]. Cahill '585 D1 considers colorants as one of those additives that are rarely added for applications that require clarity [col 18, lines 53 – 55].

D. Difference between prior art and claims

The claims require a colored article with domains between 400 and 700nm, and the type of color and amount of color chosen so that the amount of light absorbed corresponding to the domain size and is sufficient to keep the value of X less than 9.5. The container could still have Hunter transmission Haze.

The prior art, at the time of the invention, teaches keeping the domains less than the wavelength of light in order to produce a container without visual haze. This is done by using low molecular weight materials and/or special manufacturing processes. To intentionally create a container having domains within the wavelength of light, means that one of ordinary skill would go directly against the teachings of the prior art as a whole, and make articles having domains in the range of 400 – 700nm, and then add the color. This is simply something one of ordinary skill would not do, because as discussed above, haze is considered fatal to the utility of the bottle (Turner et al, D19).

Even if the Kim '987, cited in the rejection, disclosed a container with domains between 400nm and 700nm, one of ordinary skill would turn to the later Kim '684 and learn that haze is controlled by keeping the domains less than the wavelength of light. Haze is a known defect and something avoided by one of ordinary skill. Thus, to make a container with domains lying between 400 – 700nm, one of ordinary skill would have to intentionally ignore the teachings of the later Kim publication and proceed exactly opposite of its teachings.

Because haze destroys the utility of the container for packaging and clear containers are an overriding concern, the person of ordinary skill would not add color but would solve the haze first by using the teachings of:

Cahill '585 D1:
reduce the domain size to less than 300nm by using a lower molecular weight PBD and longer extrusion times. (col 20, lines 24-29; col 23, lines 53-57; col 5, lines 48-54; col 11, lines 30 – 35)

Kim '684 D2:
reduce the domain size to less than wavelength of light by lowering the amount of stretch. [0023; 0025]

Alghatta WO D12:
reduce the domain size by changing the viscosity ratio of the polymers.
(Page 2, 3rd para, lines 1-6 and last three lines)

Turner '283 D19:
reduce the haze by using lower molecular weight polymers – which is known in Cahill '585 D1 to produce smaller domains. (col 3, lines 24-30)

Even if one of ordinary skill would intentionally go against the teachings of the prior art and make a useless container with large domains and add color, there is no guarantee that the color would mask the visual haze. As demonstrated in the Examiner's Interview, changing the shear condition of the preform changes the domain distribution so the same composition that was visually clear under one set of condition is visually hazy because there are more domains between the 400 and 700nm. One of ordinary skill would have to select the right colorant and add it in the proper amounts; in other words, get lucky.

The issues of the European Opposition are easily resolved. The European Opposition takes the position that articles having domains between 400 and 700nm are known, citing the same references currently discussed in this response or previously overcome. Therefore, the previous arguments overcome the inventive step argument in the European Opposition. Since the Opponent could duplicate the work, the enablement issue is overcome as well.

It is believed that the arguments overcome all the objections and rejections and that the claims are in position to be allowed over the prior art. A notice of allowance is respectfully requested.

Respectfully submitted,

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APPENDIX A
KIM REFERENCES - COLOR

	Kim 1 (‘987) 5,314,987 1994				Kim 2 (‘684) US20020001684 2002		
		Location cite				Location cite	
		Col	Lines			Para	Lines
COLOR							
	Caused by catalyst system	3	45-53		It is known in the art that the color in PET/MXD6 structures is **due to the presence of catalyst residue** in the polyester.	50	6-8
	Switching catalysts moves system from green to yellow	4	4-12		This color can be controlled limiting the amount of catalyst.	50	8-9
	Yellowish color neutralized by gradual addition of metal (Co) to “a/g – PET blends”	4	22-28				
	Limit the amount of Catalyst to only neutral (no color)	4	31-43		Do not make a colored container Free from green	38 39	6-8 5-6
	Monolayer is the control 7.5% MXD6, PET, made on a Nissei	Table I 8	 3-6		Similar structure as ‘987, only amount of Cobalt is different	Tb 26, 27	3

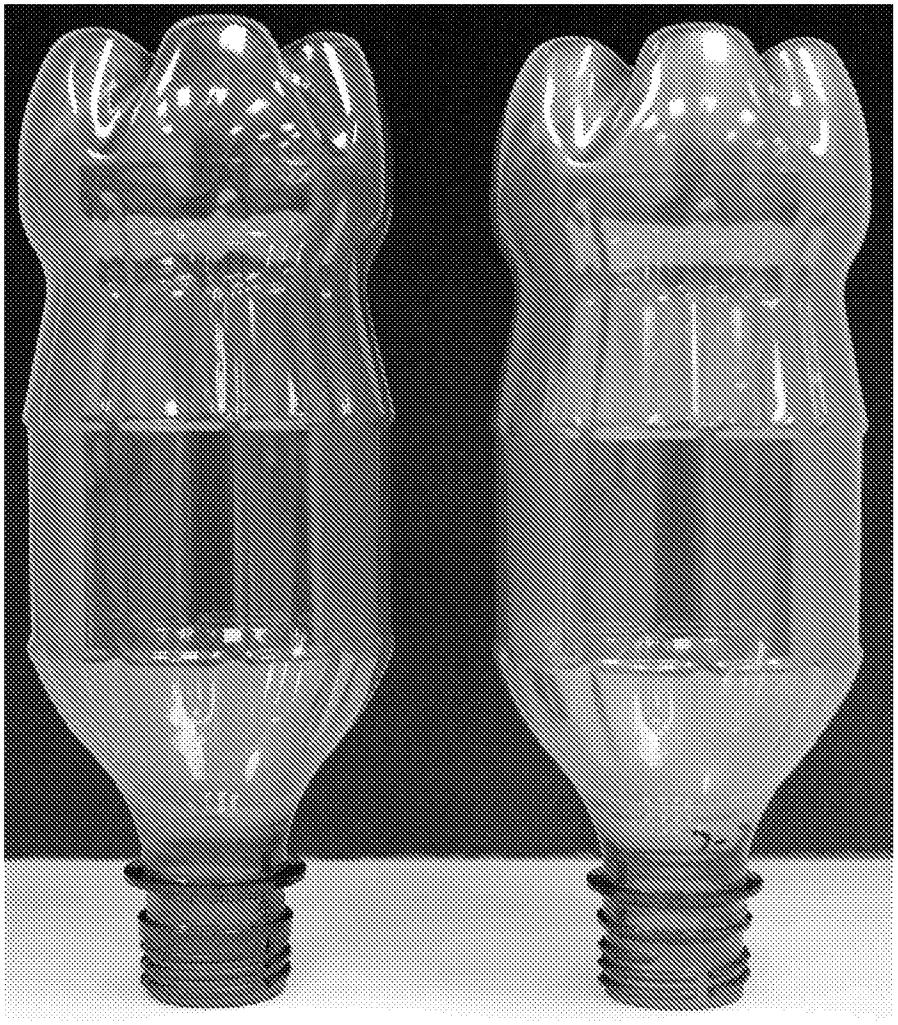
APPENDIX B
KIM REFERENCES - HAZE

	Kim 1 ('987) 5,314,987 1994				Kim 2 ('684) US20020001684 2002		
		Location/Cite				Location/Cite	
		Col	Lines			Para	Lines
HAZE							
	Clarity means neutralization of green/yellow, (not transparency/haze)	5 4	37-38 49-51		Prior art structures all hazy, includes Kim 1.	31	13-14
CAUSES OF HAZE							
					Orientation enlarges the domain size of MXD6 so that it is greater than the wavelength of light and this results in increased scattering.	23 Tb 1	7-10
					…orientation of PET and MXD6 (2 stage process) results in the development of haze caused by refractive index changes and the enlarged domains of MXD6	50	9-13
SOLUTIONS TO HAZE							
	Reduce the amount of the blend to 10% of wall thickness, Ex 2-C/D vs A/B	Table 1 8	53-57		PET blends is utilized to produce clear structures having improved oxygen barrier properties by limiting the degree of orientation so that the MXD6 domain increases in size up to **less than the wavelength of light.**	23 32 38	12-16 15-18 5
	Improved optical properties of multilayer [over monolayer] (substantially transparent), due to the fact that the blend (Ex 2-B green) is only 10% of structure and outer layers are transparent (no MXD6)	8	53-61		Use low stretch extrusion blow process – It is believed that [t]he domain size of the unoriented MXD6 is less than the wavelength of light…	51	6-8

APPENDIX C – PRIOR ART AS A WHOLE AT TIME OF INVENTION

	Tajima 5,300,572 1994 (	Kim 2 US2002/1684 2002	Al Ghatta EP 0964031 1999	Al Ghatta WO 03/029349 2003	Cahill US6083585 2000	IIADA NPL 2001	Turner US6444283 2002
OPP Ref		D2	D3	D12	D1		D19
Importance of Haze							
		Haze is undesirable [38]		Haze limits amount of polyamide, (pg 2, 1st para, last sentence)	Necessary for Commercial Packaging (C4,L4-8) See also C3,L53 – 61;	Transparency is one of the most important characteristics of PET cannot be maintained in blends (p1987, para 2)	Limits Practical Application in Packaging (C1, L55-59)
Cause of Haze							
		Domains Stretched Greater than the wavelength of light [23]			Domains about the size of wavelength of light (c11,L14-17)	Number and size of particles, plus refractive index. (p1987, Abstract)	
Solution to Haze							
		Keep the domains less than the wavelength of light [23, 25]		Keep domains within 30-200nm (p2, 3rd para, L1-6)	Keep domains less than 300nm (c17,L56-58; C5,L48-53)		
Method To Solve							
	Use compatabilizer to drive the domain diameter down C2L41-42; C7,L31-34 (Ex 12, Ex 20) Domains 100nm	Use low stretch extrusion blow process [25]		Use high shear conditions (p2, last three lines)	Control Domain Size (c20/L24-29) (c23/L53-57) Low molecular weight to maintain transparency (c5/L48-54; (c11/L30-35) and/or longer residence times for reaction		Low Molecular Weight PA (3/L24-30)
COLOR							
	Not Found in Text	Neutral, colorless, avoid green		Color only mentioned as a measurement, not as an additive (p5, para2; p6, para 5)	Few, if any, of these typical additives [colorants, etc] are used for bottle applications that require clarity. (C18,L53-54)		May be added so long as does not hinder object of invention (C7,L9-24)

APPENDIX D



	BOTTLE A	BOTTLE B Hazy
Number of Total Domains Measured	301	293
No Domains 400-700nm	89	100